510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE

A. 510(k) Number:
K040708

B. Purpose of Submission:
For the modification of their previously approved device

C. Analyte:
Group A Streptococcal antigen

D. Type of Test:
Horizontal-flow enzyme immunoassay

E. Applicant:
Princeton BioMeditech Corporation

F. Proprietary and Established Names:
Status First™ Strep A

G. Regulatory Information:

1. Regulation section:
   21 CFR Part 866.3740 Streptococcus spp. serological reagents
   Limitation: 21 CFR 866.9 (6)
2. Classification:
   I
3. Product Code:
   GTY – Streptococcus spp.
4. Panel:
   83 Microbiology

H. Intended Use:

1. Intended use(s):
   Status First™ Strep A is a rapid immunochromatographic assay for the qualitative detection of group A streptococcal antigen directly from throat swab specimens. The test is intended for use as an aid in the early diagnosis of group A streptococcal infection.
2. Indication(s) for use:
   Status First™ Strep A is an immunoassay for the qualitative detection of Group A Streptococcal antigen directly from throat swab specimens to aid in the early diagnosis of Group A Streptococcal infection.
3. Special condition for use statement(s):
   For Prescription Use Only
4. Special instrument Requirements:
   Not applicable

I. Device Description:

The device consists of a chromatography strip membrane housed in a plastic frame. The membrane carries immobilized polyclonal anti-Strep A antibody coupled to colloidal gold dye particles. The test line contains rabbit anti-group A streptococcus antibody. The control line consists of an immobilized antibody to the anti-Strep A

indicator antibody. At the control line, anti-Strep A indicator antibody-unbound/bound colloidal gold complexes form a control line in the control window which indicates that the device is functioning properly.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   BioSign™Strep A
2. Predicate K number(s):
   K971349
3. Comparison with predicate(s):

Similarities		
Item	**Device**	**Predicate**
Intended use	For the qualitative detection of group A streptococcal antigen directly from throat swabs.	same
Specimen type	Throat swab	same
technology	Immunochromatographic	same
antibodies	Polyclonal anti-Strep A	same
Limit of detection	$1.5x10^5$ cfu/ml	same
Clinical sensitivity	96.2% CI (%)	same
Clinical specificity	98.7% CI (%)	same
	Difference	
Item	**Device**	**Predicate**
Extraction method	Extraction step performed within the test device	Extraction performed in a test tube and transferred to test device

The performance of Status First™ Strep A was validated by conducting comparison studies with the BioSign™Strep A to demonstrate that performance of the assay was not altered by this modification. The firm performed time, readability, and sensitivity evaluations. A total of 120 devices were tested with negative, low (1.5×10^5 cfu/ml), and medium (1.2×10^6 cfu/ml) levels of Strep A antigen according to the test protocol in each package insert. The test signals of both tests were read at 5 minutes after sample application on the test strip. No differences were observed between Status First™ Strep A and BioSign™Strep A in the sensitivity, readability and assay time.

K. Standard/Guidance Document referenced (if applicable):

Not applicable

L. Test Principle:

Status First™ Strep A is a rapid immunochromatographic assay for the qualitative detection of group A streptococcal antigen directly from throat swab specimens. The test involves the chemical extraction of Group A streptococcal antigen utilizing solid-phase immunoassay technology for the detection of extracted antigen. In the test procedure, a throat swab specimen is collected and placed into a mixture of Reagents A and B that have been added to the extraction well of the device. If group A Streptococci is present in the

specimen, it will react with anti-Strep A indicator antibody coupled to colloidal gold particles. The mixture will migrate through the membrane as antigen-antibody-gold complexes and bind to the immobilized polyclonal anti-Strep A antibody on the membrane to generate a colored line in the Test Window. The rest of the sample and unbound/bound colloidal gold complexes continues to migrate to the control line where antibody to the anti-Strep A indicator antibody is immobilized. At the Control line, anti-Strep A indicator antibody-unbound/bound colloidal gold complexes form a control line in the Control Window. The presence of two colored lines, one in the Test window and the other in the Control window indicates a positive result. Alternatively, a negative result is described as no line forming in the test window but a line forms in the Control window.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

The reproducibility was determined using the new test device Status First™ Strep A test. The device was evaluated at three sites by three operators for three days testing 15 blind samples per person per day. The 15 samples consisted of 5 negative samples, 5 low positive samples containing approximately 3×10^5 cfu/ml, and 5 medium positive samples containing approximately 1.2×10^6 cfu/ml. The samples were prepared from known live cultures of ATCC strain 19615. The samples were provided in each vial with number coding for the blind testing. The test results by 9 operators from three sites for three days (total of 135 tests per site) showed complete agreement (100%).

b. Linearity/assay reportable range:

Not applicable

c. Traceability (controls, calibrators, or method):

Not applicable

d. Detection limit:

The minimum detectability of the test is 1.5×10^5 cfu/ml that was established by testing a known number of organisms, (ATCC 14285 or ATCC 19615) using Todd Hewitt Broth. The culture organisms were serially diluted in culture medium and tested by BioSign™ Strep A. The same dilutions were cultured overnight on sheep blood agar plates for cell enumeration in cfu/ml.

e. Analytical specificity:

The analytical specificity using the predicate BioSign™Strep A device were accepted. No additional studies were required. In that study, organisms expected to be found in the respiratory tract were tested at a final concentration of 1×10^7 organisms per mL. The organisms were tested alone in the device as well as spiked with a positive Strep A control (3×10^5 cfu/ml) to confirm the test results. The results were all negative which confirmed that none of the microbial agents tested reacted with the device.

No interference study was conducted with the previously approved device or new device.

f. Assay cut-off

The assay was determined to detect 1.5 x 10^5 cfu/ml.

2. Comparison studies:

a. Method comparison with gold standard:

Not applicable

b. Matrix comparison:

Not applicable

3. Clinical studies:

a. Clinical sensitivity:

The original performance studies using the BioSign™ Strep A were accepted for this modified device. The predicate device was compared to conventional plate culture techniques in a prospective evaluation of clinical specimens. Throat swab specimens were collected from 505 children and adult patients with pharyngitis symptoms. The results of the parallel tests are given below.

	BioSign™ Strep A		
	Pos	Neg	Total
Confirmed 18/48 hours (+)	127	5	132
Culture Results (-)	5	368	373
Total	132	373	505

		95% CI
Clinical sensitivity	127/132 (96.2%)	95-98.9%
Clinical specificity	368/372 (98.7%)	98-100%

b. Clinical specificity:

Refer to (a.) above

c. Other clinical supportive data (when a and b is not applicable):

Not applicable

4. Clinical cut-off:

The lower limit of detection of this assay is 1.5 x 10^5 cfu/ml.

5. Expected values/Reference range: (Interpretive Criteria)

Group A Streptococcus infection exhibits a seasonal variation and is most prevalent in the winter and early spring. Approximately 19% of all upper respiratory tract infection are caused by group A Streptococcus. The highest incidence of this disease is found in high density populations, such as school aged children and military bases. Males and females are equally affected by the disease.

N. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.